VA TECH

VA TECH HYDRO

HYDRO SERVICE
VALUE ADDED SOLUTIONS FOR YOUR HYDRO ASSETS

sustainable solutions. for a better life.

www.vatech-hydro.com

VOEST MCE ELIN SAT AUTOMATION

MORE POWER WITH THE SPECIALISTS

As an environmentally friendly and renewable energy source, hydropower is increasingly becoming a focal point of global interest.

We are therefore taking our economic, ecological and social responsibilities seriously and have made it our goal to spearhead innovative technological developments in the field of renewable energy sources. Our service commitment – to serve our customers locally all over the world – and our experience in troubleshooting, even under the most adverse circumstances – not to mention our cutting edge technologies – are all reasons why you can be assured of the best energy solutions. Through our renowned experts and innovative programmes to enhance efficiency, the economic benefits of these power solutions are guaranteed.

The VA TECH HYDRO supply spectrum ranges from equipment for new turnkey hydropower plants to refurbishment and overhaul of existing installations.

The collaboration of our specialists of the former VA TECH Escher Wyss, VA TECH VOEST MCE, VA TECH ELIN and now also VA TECH SAT, guarantees that you will have the best partners for all your new hydropower projects at your side.

OUR SERVICE
YOUR COMPETITIVE GAIN

In today's radically changing world, you need a strong, dependable partner who knows your business.
Like VA TECH HYDRO: a world leader in hydropower plant equipment with particular strength in service and rehabilitation. We upgrade your plant, enhancing profitability and long-term value.

We generate added value for you

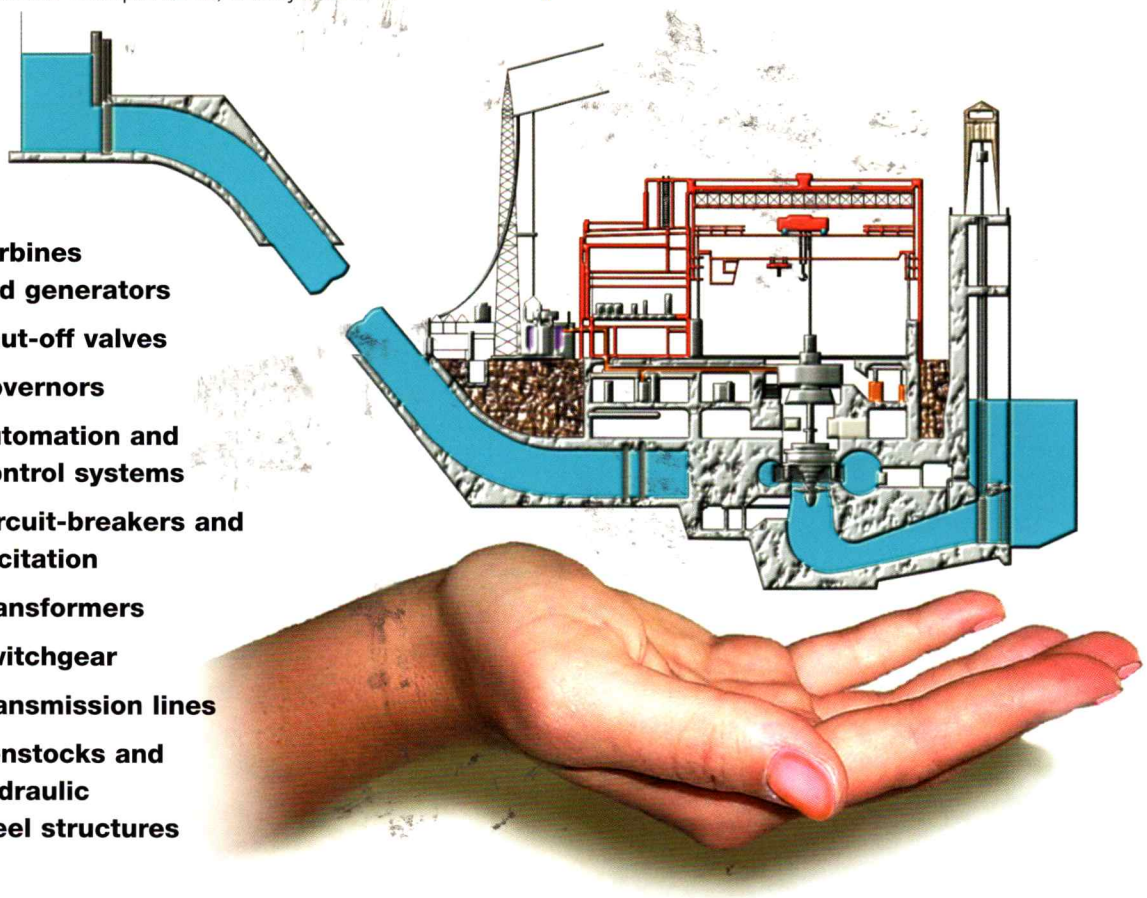
Our products and services are dedicated to meeting your needs comprehensively in power generation, distribution and sales.
We do this by:

- increasing plant availability, dependability and safety
- boosting production through optimal utilization of available water resources
- increasing yield from peak power generation and grid regulation
- reducing service and maintenance outlay
- reducing risks of standstills and unplanned maintenance
- optimizing plant value and operating life

Birsfelden (Switzerland): 5 % more energy production

VA TECH HYDRO: everything in good hands

As overall system supplier, we cover all your needs on a single-source basis for maximum plant life and profitability. Whether components, subsystems or complete installations, we have everything it takes.



Turbines and generators

Shut-off valves

Governors

Automation and Control systems

Circuit-breakers and excitation

Transformers

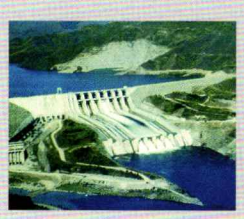
Switchgear

Transmission lines

Penstocks and hydraulic steel structures

The comprehensive VA TECH HYDRO offering

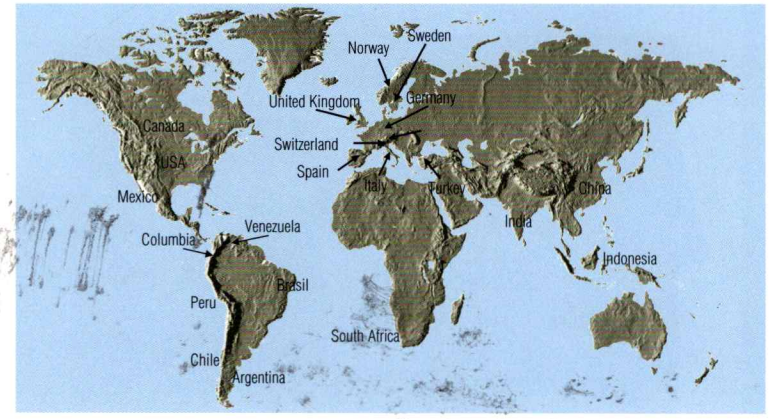
Gates and inlet valves
Penstocks and shutoff valves



Turbines, governors and generators including excitation
Automation, control and safety systems

Global competence – local presence

For rapid, competent and on-the-spot response to your needs – thanks to the global know-how of VA TECH HYDRO and our local service centers, with specialists who speak your language.



How we generate added value for you

Depending on energy market developments, your goals and plant circumstances, we optimally combine our service and rehab to maximize your return on investment:

- Service optimizes profitability and plant value by continuously enhancing operation and maintenance
- Rehabilitation increases plant value and profitability by improving output and energy production in one go

Bhumibol (Thailand): 10 percent more installed capacity

Products and Services for modernization

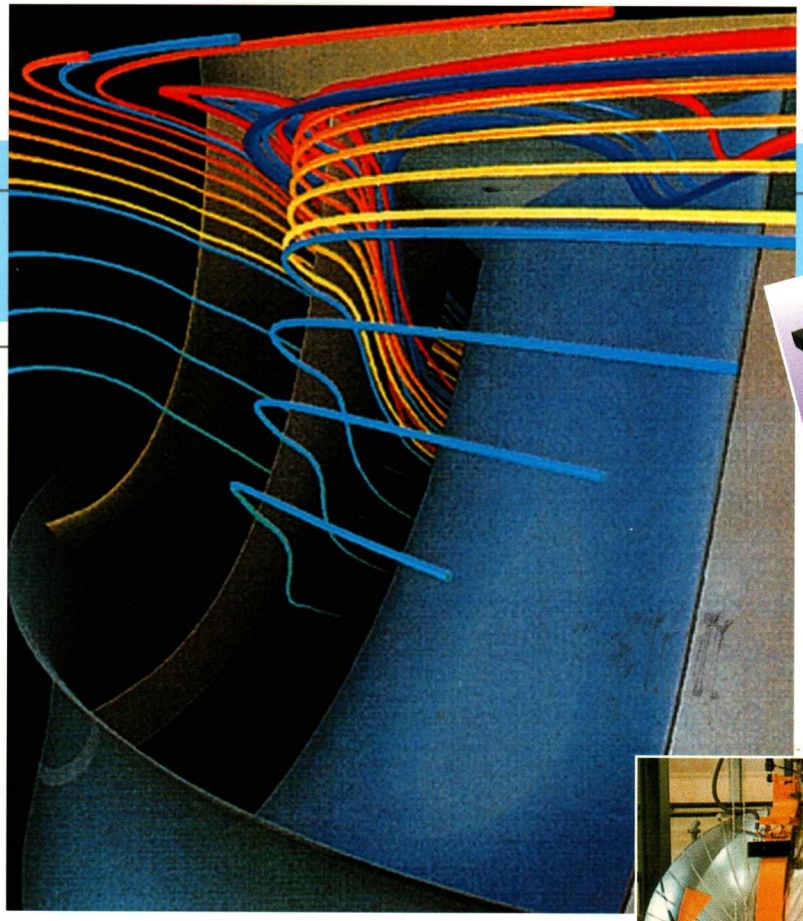
Customized Hydro Service solutions enhances energy production as well as earnings from peak power generation and ancillary regulation. Our comprehensive modernization services cover the following aspects:

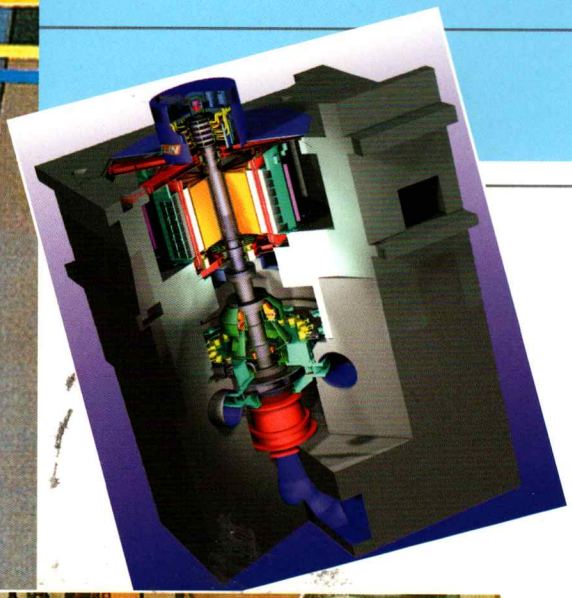
- General overhaul/repairs
- Performance enhancement/modernizatio
- Inspection/monitoring
- Management and diagnosis systems
- Fault analysis and troubleshooting
- Safety engineering/residual life-cycle analysis
- Technical and economic feasibility studies
- Plant automation and remote control
- Project planning and management
- Turnkey projects
- Financial engineering

Products and services for plant operation and maintenance

Our innovative service offering enhances your plant reliability while at the same time reducing operation and maintenance costs. We cover all plant service needs:

- Spare parts management
- Operation and service contracts
- Plant management
- Inspection and diagnosis
- Condition-related maintenance systems
- Training of operating personnel
- Operation and maintenance benchmarking
- Tools for technical and cost optimization
- Consulting
- Service technicians



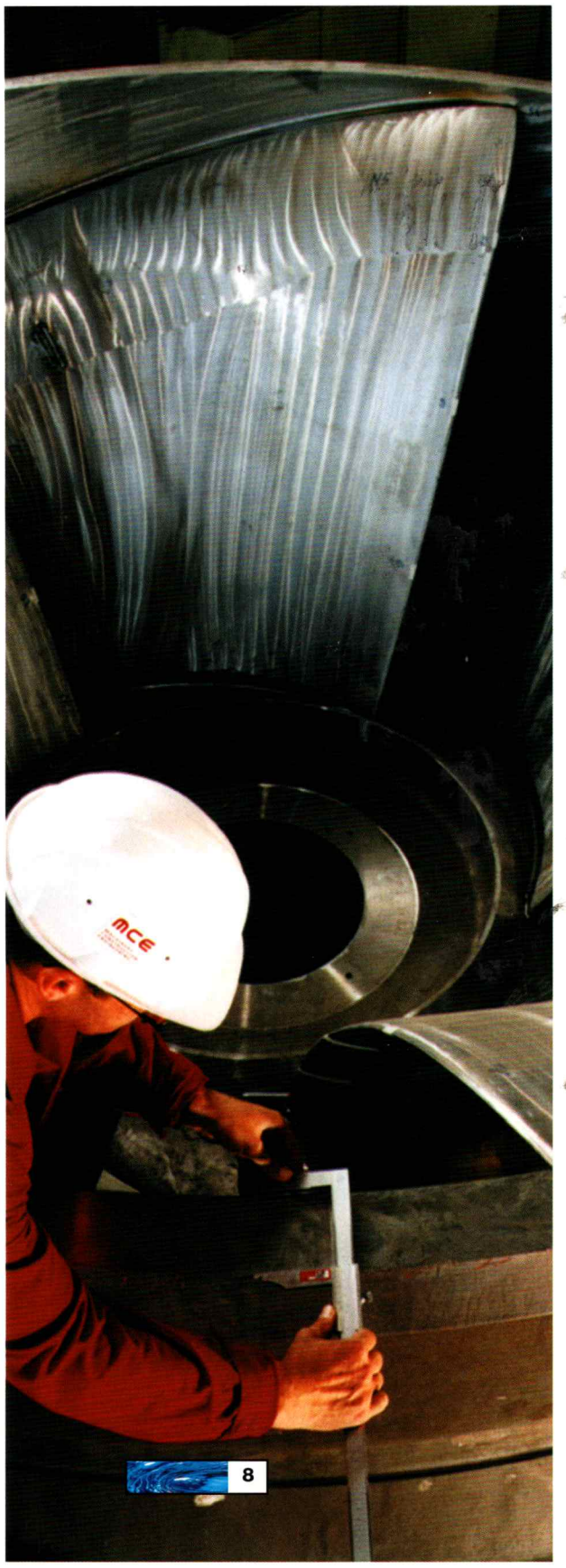


Customer benefit thanks to innovation

Our widely based research effort – also in Cooperation with international partners – keeps us on the front line of innovation to market maturity. Here are some typical examples:

VPI high-voltage generator insulation
Thanks to our generator expertise we have significantly improved dielectric characteristics for high-voltage insulation – an important factor in hydro plant service or modernization. This makes our insulation much thinner than in conventional systems without sacrificing reliability, thus enabling larger copper winding cross-sections, lower losses and corresponding higher output or efficiency

MicroGuss™
The innovative MicroGuss™ technology enables much faster production of Pelton turbine runners than by conventional casting methods. Each bucket is entirely NC-machined (inlcuding the root zone) to ensure precise compliance with the optimal hydraulic contour. And by using forged steel



for the runner disk – the most highly loaded component – service life is increased several times.
By March 2002 more than 164 MicroGuss™ Pelton runners had been ordered, at least 134 of which are already in service. So far they have accumulated 1.4 million operating hours without any sign at allof crack formation.

Elastic winding beddings (EWB)

VA TECH HYDRO has developed a system for the permanently elastic embedment of high-voltage windings in stator and rotor cores, using a highly conductive elastomer material.
With high reliability, this offers the following advantages over conventional systems:

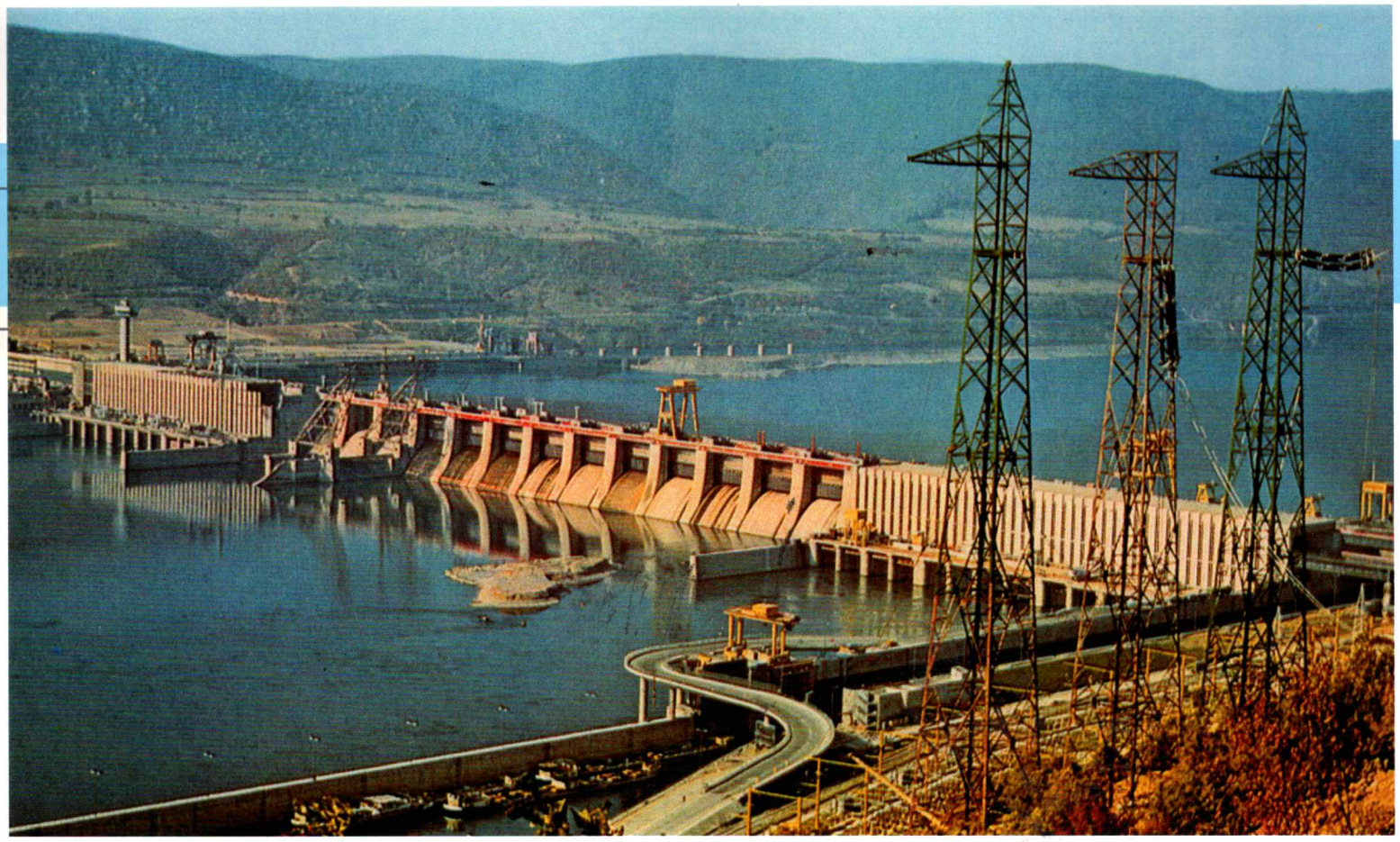
- No more loose windings as with conventional ripple-spring technology
- Free thermal expansion of stator windings according to load
- Good thermal and electrical conductivity between windings and core
- High heat resistance
- Permanent elasticity

Ceramic coatings

VA TECH HYDRO has comprehensive expertise in minimizing wear and tear on hydro machinery. For your hydro powerplant this means far longer service intervals, and much slower efficiency decline.
Thanks to our sophisticated numerical analysis methods, we can tell you in advance how much wear to expect on new machinery or components.

Right through your plant life

VA TECH HYDRO recognized long ago the vast untapped potential in hydropower plant modernization, rehabilitation and maintenance. However old your plant, our optimized Hydro service solutions help to



Iron Gates (Romania): 200 MW more installed capacity

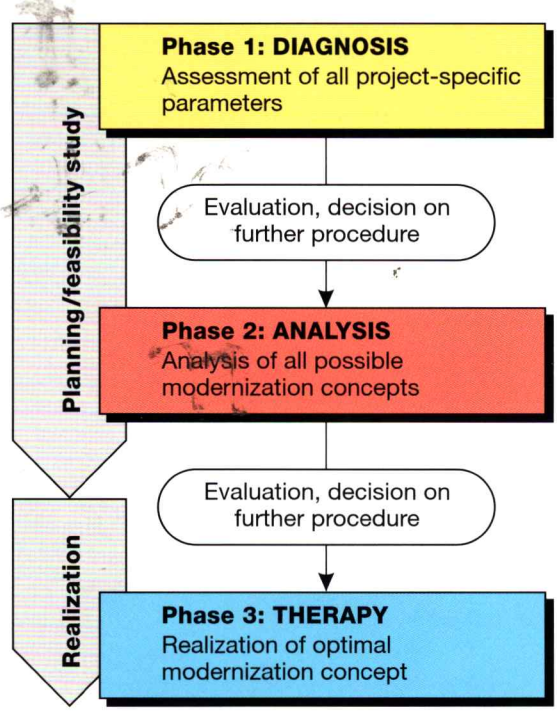
maximize your energy production in a competitive market. For fast and efficient optimization, we have developed a step-by-step procedure.

Three-phase success plan

Our 3-phase procedure for power plant modernization (diagnosis, analysis and ther-apy) has proved itself exceptionally well in practice. It meets all demands in connection with task complexity and customization requirements.

The challenge of modernization projects is to define which components have to be replaced or upgraded, the primary goal being to maximize customer earnings from energy production, ancillary services, etc. At the same time, combining new components with old ones and modifying operating conditions accordingly must not affect the powerplant safety. On the contrary, the result should be enhanced reliability and longer service life.

Formerly, the same procurement procedure was used for power plant modernization as for new plant investments – a public



tender invitation with fixed specification. This is not always ideal, since a tightly formulated specification greatly restricts the scope of tenders, and the final result may not be the optimal solution for the customer requirements. Suppliers are not involved until an advanced stage of the project, which gives them less freedom for alternative solutions maximizing the benefits of modernization.

The proven advantage of our 3-phase plan is that all alternatives are thoroughly analyzed – already at the planning stage – by modern techniques (numerical flow simulation, model tests, residual life-time analysis, dynamic simulation, etc.). As a result, the plant owner can select the optimal modernization concept based on comprehensive cost/benefit data. This includes a detailed scope of work, investments required, implementation schedule and associated production outages, resultant improvements, etc.

The optimal scenario is thus identified, while at the same time minimizing risks and avoiding exaggerated performance forecasts. The project status reports included in our 3-phase plan cover all technical, economic and environmental aspects, etc. This gives you the ongoing possibility of checking return on your investment, and taking action accordingly.

As a net result, thanks to our 3-phase plan you reach your goals with minimum outlay and maximum return.

Our track record

VA TECH HYDRO has been building hydro plants for over 160 years – longer than any other supplier worldwide. With more than 225,000 MW installed capacity, we are a global leader in hydropower products and services.

Our reference base in service and rehabilitation:

Service
We currently have long-term service and maintenance contracts for 70 hydro plants worldwide totalling 180 units.

Modernization
Over the last thirty years, we rehabilitated 800 hydropower units in more than 30 countries with installed capacity approaching 25,000 MW.
We also equipped more than 500 plants with state-of-the-art control systems.

Financing

Apart from working out the best technical and cost-effective solution for your modernization needs, we also offer you financing support. Our anchorage in the global VA TECH Corporation gives you access to optimal financing conditions and to worldwide development support programs for regenerative energy utilization.

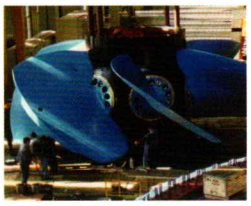
You con count on us

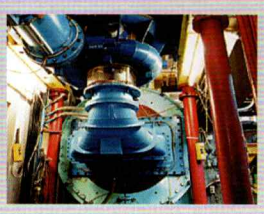
Whatever your needs –
wherever you are –
we're here to serve you!

WHY OUR SERVICE MAKES MORE OF YOUR ASSETS

Iron Gates I

Europe's largest River Power Station Iron Gates I on the Danube River comprises twelve vertical Kaplan turbines with more than 2,000 MW installed capacity.
VA TECH HYDRO is performing a comprehensive overhaul and modernization program of the 6 Romanian units. Besides securing the power supply for Romania, the capacity of the power plant will be boosted by more than 10 %.





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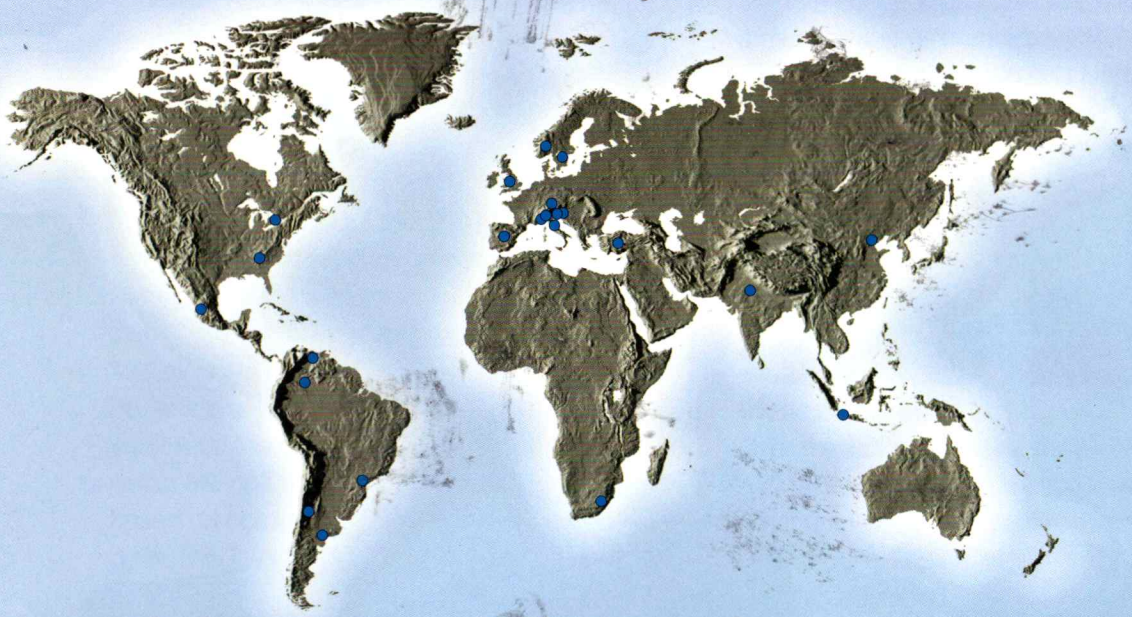

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